Military Issue Iodine Tablets – Globaline™

NSN 6850-00-985-7166

Device Information

Military issue iodine tablets, known as Globaline, are used for treating individual water supplies. One manufacturer, Wisconsin Pharmacal markets Globaline as Potable Aqua for civilian use and also manufactures Coghlan's Emergency Drinking Water Germicidal Tablets™ for Coghlan's Ltd. All these products are identical. The Globaline tablets are packaged in a small bottle (50 tablets per bottle) with a vinyl lined screw cap. The cap and bottle come from the manufacturer sealed with wax to prevent moisture from getting into the bottle. Directions for use tell the Soldier to add two tablets to a 1-quart (1 liter) canteen, wait 5 minutes, shake the canteen, loosen the cap and let water cover the neck of the canteen, then wait 30 more minutes before drinking. Two tablets result in a 16 mg/L iodine concentration in a 1-quart canteen. Globaline is composed of tetraglycine hydroperiodide, sodium acid pyrophosphate and talc. The disinfection capabilities of iodine have long been recognized and it is widely used as an antiseptic and as an emergency drinking water disinfectant. The U.S. Army's Field Manual (FM) No. 4-25.12 also provides the same directions for use of Globaline (reference 1).

Effectiveness Against Microbial Pathogens

Independent testing using the U.S. Environmental Protection Agency (USEPA) Guide Standard Protocol for Testing Microbiological Water Purifiers (reference 2) indicate Globaline met the minimum 6-log reduction for bacteria and 4-log reduction for viruses (references 3, 4). The data also indicate Globaline did not meet the minimum 3-log *Giardia* cyst inactivation requirement when used as directed. Additionally, data indicate Globaline did not provide a 3-log *Cryptosporidium* oocyst inactivation (reference 4). Globaline, when used according to directions, provides a 16 mg/L iodine dosage and a 35 minute contact time resulting in a disinfectant concentration times contact time (CT) of 560 mg-min/L. Globaline can provide a 3-log *Giarida* cyst inactivation when treating most water quality conditions if contact time is increased beyond the directed 35 minutes. Independent testing data using reference 2 protocol indicated contact times of at least 60 minutes (CT = 960 mg-min/L) achieved a 3-log *Giardia* cyst inactivation (reference 3). Other iodine disinfection studies recommend a CT of at least 720 mg-min/L for a 3-log *Giardia* cyst inactivation (reference 5). To ensure a 3-log *Giardia* cyst

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inactivation when using Globaline, provide at least a 45-60 minute contact time. A 3-log *Cryptosporidium* oocyst inactivation is not realistically achieveable when using Globaline. Additional treatment is necessary to remove or inactivate *Cryptosporidium* oocysts. Based on independent data testing the device under severe conditions required by the USEPA protocol, the Globaline tablets are given three √s for effectiveness against bacteria and viruses, and an X for effectiveness against *Giardia* cysts and *Cryptosporidium* oocysts (for an explanation of the rating checks click here). The following table summarizes Globaline's expected performance, evaluation rating, and the mechanism by which the pathogens are reduced:

Table. Expected Performance Against Microbial Pathogens When Used As Directed.

Microbial Pathogen Type	Expected Performance	Evaluation Rating	Inactivation/removal Mechanism
Bacteria	> 6-log	√√√	disinfection
Viruses	> 4-log	√√√	disinfection
Giardia cysts	Not Effective*	X*	-
Cryptosporidium oocysts	Not Effective	X	-

* Recommend at least 45-60 minutes contact time to ensure 3-log *Giardia* cyst inactivation.

Production Capacity

One bottle of Globaline iodine tablets treats 25 liters (2 tablets per liter of water).

Cleaning, Replacement, End of Life Indicator

The manufacturer does not provide shelf life recommendations. Once the wax seal on the bottle is broken and the bottle is opened, the iodine tablets will begin to deteriorate. The tablets can last several months if the bottle is kept tightly closed between use. In general, the potency of the tablets can be determined by their color. As the tablet deteriorates, the color changes. A fully effective tablet is steel gray. A 50 % deteriorated tablet is white to yellowish brown, and a completely deteriorated tablet is deep brown. The Field Manual (FM) 4-25.12 notes that iodine tablets should be a uniform gray in color with a smooth even surface. Tablets that are yellowish brown or crumbling should be turned in and replaced with new iodine tablets (reference 1).

Weight and Size

The weight of the bottle is approximately 50 grams. The approximate dimensions of the bottle are 5 cm x 2.5 cm (H x Dia).

Cost

The National Stock Number (NSN) for Globaline is NSN 6850-00-985-7166. The cost is $1.54 per bottle.

Device Evaluation

Independent testing using the USEPA Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 2) confirms the Globaline tablets met the minimum 6-log and 4-log reduction for bacteria and viruses, respectively. The Globaline tablets did not meet the minimum 3-log *Giardia* cyst and *Cryptosporidium* oocyst inactivation requirements when used as directed. Globaline can provide a 3-log *Giarida* cyst inactivation when more than 60 minutes contact time is provided. Globaline tablets are not effective against *Cryptosporidium* oocysts. Additional treatment such as filtration with a 1 µm absolute filter to reduce *Cryptosporidium* oocysts is necessary. Globaline tablets are not expected to cause any adverse health effects when used by healthy adults with no pre-existing thyroid conditions or sensitivity to iodine. Globaline tablets are not recommended for use by pregnant women (concern for fetus), people with known hypersensitivity to iodine, people with a history (or family history) of thyroid disease, and people from areas with chronic iodine deficiency (reference 5). Iodine in the Globaline tablets can cause a medicinal taste and color the water. The iodine can be neutralized by adding ascorbic acid (Vitamin C) or sodium thiosulfate, which will improve the taste and color. Flavored drink mixes can mask the flavor. Neutralizers and flavor aids should not be added until after recommend contact times are achieved. Use of the tablets will not remove or reduce particulate matter.

Advantages

- Independent testing using the USEPA protocol confirms 6-log bacteria and 4-log virus reduction when treating most water quality conditions expected when used as directed.
- Very small and lightweight.
- Simple and inexpensive to use.
- No adverse health effects expected in healthy adults with no iodine sensitivity.

Disadvantages

- Not effective against *Cryptosporidium*. Additional treatment is necessary.
- Not consistently effective against *Giardia* cysts when used as directed. Recommend at least 45-60 minute contact time for adequate *Giardia* cyst reduction.
- Not recommended for use by pregnant women or people with iodine sensitivity.
- Does not reduce or remove particulate matter.
- Can impart color and medicinal taste.

References

1. U.S. Army FM No. 4-25.12, Unit Field Sanitation Team, Washington, DC, 25 January 2002.

2. USEPA, Registration Division Office of Pesticide Program, Criteria and Standards Division Office of Drinking Water, 1987. *Guide Standard and Protocol for Testing Microbiological Water Purifiers.* Washington, D.C.

3. U.S. Army Natick Research, Development, and Engineering Center, 1993. *Efficacy of Flocculating and Other Emergency Water Purification Tablets.* (NATICK/TR-93/033). Natick, MA. Prepared by Powers, E.M.

4. Gerba, C.P., Johnson, D.C., & Hasan, M.N, 1997. Efficacy of iodine water purification tablets against *Cryptosporidium* oocysts and *Giardia* cysts. *Wilderness and Environmental Medicine*, 8, 96-100.

5. U.S. Army Center for Health Promotion and Preventive Medicine, 2005. *Technical Information Paper; Iodine Disinfection in the Use of Individual Water Purification Devices,* Aberdeen Proving Ground, MD.